OAR Box 1374

Prepped by Charmelle Mathews

Document Number:

7) V-B-24

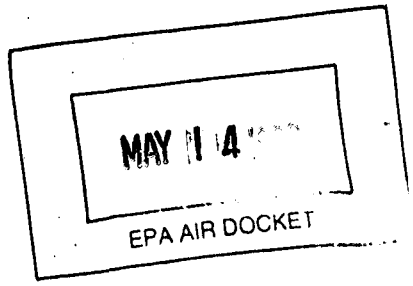
Docket Number:

A-93-02

DOCKET NO: A-93-02
V-B-24

TECHNICAL SUPPORT DOCUMENT FOR SECTION 194.43:

PASSIVE INSTITUTIONAL CONTROLS IMPLEMENTATION COST ESTIMATE



U. S. ENVIRONMENTAL PROTECTION AGENCY
Office of Radiation and Indoor Air
Center for the Waste Isolation Pilot Plant
401 M. Street, S. W.
Washington, DC 20460

MAY 1998

Technical Support for this document was provided by TechLaw, Inc. and its subcontractors under EPA Contract 68D50174.

TABLE OF CONTENTS

Appendices

EXECUTIVE SUMMARY

This technical support document was prepared to develop an independent cost estimate, in 1997 dollars, for the implementation of three elements of the Waste Isolation Pilot Project (WIPP) Passive Institutional Controls (PICs). These element were: construction of a berm which outlines the perimeter of the subsurface storage area, construction of large stone kiosks / markers, and archival of printed information worldwide.

The total volumes calculated for each berm material type were as follows: 1) soil / riprap 129,688 cubic yards (cy); 2) riprap 189,128 cy; 3) caliche 252,892 cy; 4) salt 443,473 cy; and 5) excavated soil 439,747 cy, with the total cost of the 1,325,240 cy berm construction was estimated to be $40,043,031. The total cost of 48 kiosks / markers construction with metal anchors was estimated to be $15,313,723; however, if these same 48 kiosks / markers were constructed with stone interlock the total estimated cost would rise to $28,252,813. Depending on how the documents are bound (saddlestitched or perfect bound) the cost estimate ranges from $80,500 to $90,750, respectively. Shipping of the documents was estimated to be $15,000.

The grand total of the cost estimates were $68,401,595 (1997 dollars). A summary of these data is provided in the following table.

Based on approximately 50 years of construction data collected by the R.S. Means company for both a thirty US city average, and Albuquerque, New Mexico it is anticipated that construction costs will increase by approximately three to four fold during the next century. The following figure presents these historic construction cost data. These data suggest that the construction costs of the PICs in the year 2100 may range from $205,000,000 to $275,000,000.

PASSIVE INSTITUTIONAL CONTROLS - IMPLEMENTATION COST ESTIMATE

1.0 INTRODUCTION

The Department of Energy (DOE) has submitted a Title 40 Code of Federal Regulations (CFR) Part 191 Compliance Certification Application (CCA) for the Waste Isolation Pilot Plant (WIPP), which is located near Carlsbad, New Mexico, to the Environmental Protection Agency (EPA) for review. As part of the CCA DOE has proposed passive institutional controls (PICs) which would serve to warn future generations of the dangers imposed by the transuranic wastes which are to be entombed at the WIPP site. These PICs are intended to convey information for a period of approximately 10,000 years and include such items as: large man-made structures (berms), large stone kiosks / markers, and archival of printed information.

1.1 SCOPE

This technical support document was prepared to develop an independent cost estimate, in 1997 dollars, for the implementation of three elements of the WIPP PICs. These element were: construction of a berm which outlines the perimeter of the subsurface storage area, construction of large stone kiosks / markers, and archival of printed information worldwide.

2.0 DATA COLLECTION

2.1 BERMS

Berm geometry information was provided in Chapter 7, Figure 7-15, page 7-75 of the CCA, as well as CCA Appendix PIC, Figure VIII-2, page 72. These data provided cross-sectional and plan views of the berm, and construction material requirements.

Construction costs related to the berm were derived from the R. S. Means Heavy Construction Cost Data, 11th Annual Edition, 1997. This construction cost estimating guide has been used throughout the construction industry since 1942 and has been established as an industry standard.

2.2 KIOSKS / MARKERS

Kiosk / marker specifications were provided in Chapter 7, Figures 7-12 and 7-13, pages 7-69 and 7-71 of the CCA, as well as CCA Appendix PIC, Figures V-1, V-2, and V-4, pages 48, 49 and 51. These data provided marker specifications, dimensions, engraved message contents and plan views. Specifically, 16 kiosks / markers would be placed at spacing of approximately 600 feet along the perimeter of the berm, and 32 kiosks / markers would be placed at spacing of approximately 2600 feet along the perimeter of the WIPP Site Boundary, for a total of 48 kiosks / markers.

Cold Spring Granite Company of Cold Spring, Minnesota and Keystone Granite Company of Elberton, Georgia were contacted to provide technical information and cost estimates for the construction of the kiosks / markers. Construction costs related to the installation of the markers were derived from the R. S. Means Heavy Construction Cost Data, 11th Annual Edition, 1997. This construction cost estimating guide has been used throughout the construction industry since 1942 and has been established as an industry standard.

2.3 ARCHIVAL OF PRINTED INFORMATION

2.3.1 Printing and Binding

A.B. Hirschfeld Press of Denver, Colorado was contacted to establish costs associated with the printing and binding of the WIPP PIC related documentation. Specifications for paper and ink as set forth in the PIC Design Report Revision 0, Section XIV, Offsite Archival Storage, which references the paper requirements of National Archives and Records Administration (NARA) Bulletin Number 95-7 were provided to A. B. Hirschfeld Press.

These specifications included the following:

- Text and cover of alkaline paper;

- Carbon black ink with a pH greater than 5.5;
- 100 document sets (Title 40 CFR Part 191 Compliance Certification Application, pg. 7-79);
- 50 volumes per set (assumption made for estimating purposes);
- 100 pages per volume (assumption made for estimating purposes);
- Camera-ready copy provided to printer; and
- FOB Denver.

2.3.2 Archives

USA

On February 28, 1997, a meeting was held with Joel Barker, Director of the Rocky Mountain Region National Archives (Archives), and select staff members of the Regional Archives and Records Center which is located at the Denver Federal Center.

The Regional Archives and Records Center provided assistance in obtaining telephone numbers for National Archives in other countries and identified Ms. Nancy Bartlett of the Society of American Archivists (SAA) at the University of Michigan as a source of additional information. Although Ms. Bartlett of the SAA could not be contacted since she was out of the country for several weeks, Mr. Bill Wallock, SAA, provided a Web Site address (HTTP:// www.lib.uidaho.edu / special-collections / other. repositories. html) which he thought might be helpful in obtaining international archive telephone numbers. A search of the Web Site revealed that there was only limited information obtainable at that address. The National Archives in Canada, the United Kingdom, and Australia were successfully contacted. In an effort to obtain information on archiving information in Mexico, Ms. Marsh Wilis, Program Director of the Americas Development Group was contacted. Ms. Wilis resides on the Board of Directors of the Mexico Cultural Center and North American Trade Dispute Resolution Center, and was the former President of the Colorado Advisory Council on Mexico, and presently represents the State of Veracruz, Mexico on international development.

3.0 DATA PRESENTATION

3.1 BERMS

The berm cross section was divided into five material types: 1) soil / riprap exterior armor which would be vegetated; 2) riprap armor for the caliche underlayment; 3) caliche cap for the salt core; 4) salt core; and 5) excavated existing soil which would provide a keyway for the construction of the berm (Appendix A). The total volumes calculated for each material type are as follows: 1) soil / riprap 129,688 cubic yards (cy); 2) riprap 189,128 cy; 3) caliche 252,892 cy; 4) salt 443,473 cy; and 5) excavated soil 439.747 cy (Appendix A).

In an effort to simulate the actual construction of the berm, construction activities were divided into 17 distinct efforts:

1)	Clear and grub the berm footprint, over-excavation area and five miles of access roads;	$251,983
2)	Grub stumps and remove the same areas as listed above;	$112,840
3)	Topsoil stripping and stockpiling same areas as above;	$634,091
4)	Hauling of salt core material;	$3,048,433
5)	Backfilling of salt core material;	$850,581
6)	Compaction of salt core material;	$254,553
7)	Hauling of screened caliche material;	$9,205,269
8)	Backfilling caliche material;	$485,047
9)	Compaction of caliche material;	$145,160
10)	Hauling of riprap material;	$5,219,932
11)	Placing riprap material;	$7,425,756
12)	Backfilling riprap material;	$102,110
13)	Backfilling excavated soil material;	$142,954
14)	Compaction of excavated soil;	$42,781
15)	Hauling soil / riprap armor;	$3,579,389
16)	Placement of soil / riprap armor; and	$8,319,597
17)	Seeding berm, overexcavated areas, and access road.	$222,555
Total cost of berm construction		$40,043,031

Cost data related to the construction of the berm is presented in Appendix B.

3.2 KIOSKS / MARKERS

In an effort to simulate the actual construction of the kiosks / markers, fabrication and construction activities were divided into six distinct efforts:

1)	Quarrying and finishing of components for five piece marker using metal anchor technology including delivery of 48 markers to Albuquerque, New Mexico;	$12,939,102
1A)	Quarrying and finishing of components for five piece marker using no metal with rock interlock technology including delivery of 48 markers to Albuquerque, New Mexico;	$25,878,192
2)	Sandblast engraving of messages ;	$1,741,555
3)	Transport to the WIPP Site from Albuquerque;	$300,000
3)	Excavation of marker foundations;	$24,806
4)	Backfill and compact marker foundations;	$10,429
5)	Kiosk / marker handling and installation on site;	$245,088
6)	Kiosk / marker unloading and transport on site;	$52,142
Total cost of kiosk / marker construction with metal anchors		$15,313,723
Total cost of kiosk / marker construction with stone interlock.		$28,252,813

3.3 ARCHIVAL OF PRINTED INFORMATION

3.3.1 Printing and Binding

Depending on how the documents are bound (saddlestitched or perfect bound) the cost estimate ranges from $80,500 to $90,750, respectively. Appendix D provides a cost estimate for printing and binding.

3.3.2 Archives

USA

The US National Archives confirmed that they would accept the WIPP documents which would be stored in an environmentally controlled area to increase the life expectancy of the documents. Once documents are accepted by the Archives, the Archives has legal custody of the documents. All costs associated with storage, use, and preservation of the documents are borne by the Archives and are not passed on to the originator of the documents.

The Archives provided a copy of the National Archives and Records Administration (NARA) Bulletin Number 95-7 which specifies the type of paper to be used for the creation of Federal records (Appendix E). The bulletin concurs with the paper specifications for the WIPP document as set forth in the CCA.

United Kingdom

The national archives for the UK are maintained by the Public Record Office (PRO). The Government Services Department of the PRO indicated that they do not normally accept documents from other nations. The Chief Executive of the PRO will entertain a written request for inclusion of the WIPP document in the archives. Such a request should be directed to:

Mrs. Farah Tyacke, Chief Executive
Public Record Office
Ruskin Avenue
Kew
Surrey
TW9 4DU
Tel. 44 181 392 5200

Canada

The National Archives of Canada do not normally accept documents from other nations. A written request will be taken under consideration. The request should be directed to:

Mr. Eldon Frost
Director, Manuscript Division
National Archives of Canada
395 Wellington Street
Ottawa, Ontario
K1A 0N3
Tel. 613-993-7254

Australia

The Australian Archives will accept only documents which pertain to the Commonwealth. Ms. Dagmar Parer of the Australian Archives indicated that there may be other institutions such as

universities and libraries which may accept the WIPP document. Ms. Parer offered her assistance in identifying such repositories and may be contacted at:

Australian Archives
National Office
Mining Industry House
216 Northbourne Avenue
Braddon ACT 2612
Tel: 61 6 209 3633

Mexico

Various organizations were contacted in an effort to establish the proper repository for the WIPP information. The most appropriate site may be with the National Commission for Science and Technology (CONACYT - Mr. Ruben Barocio Ramirez, Engineer, e-mail - cnaap@supernet.com.mx) which is located in Mexico, City. Other options include:

- The National Archive, Ms. Sylvia Lara Cobos, Lic.; however, this facility did not express great interest;
- The Secretariat of Ecology, Environment, Natural Resources, Mining and Fisheries (SEMARNIP), most permits for mineral exploration are processed by this agency;
- National University , located in Mexico City, Dr. Caspar MacGregor Cruz;
- Technology Institute, located in Monterey, Mexico;
- The National Statistics and Geographic Institute (INEGI);
- National Commission of Nuclear Security and Safeguards
  (Commission Nacional de Seguridad Nuclear y Salvaguardas),
  Engineer (Ing.) Miguel Medina Vaillard, Director General
  Dr. Barragan 779, 5o. Piso, Col. Narvarte
  03020 Mexico, D.F.
  Tel: 011-52-5-590-5182; 590-4181
  Fax: 011-52-5-590-6103

- Light and Energy Distribution and Commercialization Company
  (Distribucion y Comercializacion Compania Mexicana de Luz y Fuerza del Centro)
  Engineer (Ing.) Juan Eibenschutz Hartman, Subdirector
  Tel: 011-52-5-629-7174; 140-029
  Auxiliary Contacts: Sra. Marta Cacho; Sria Srta. Beatriz Olvera

- PEMEX Industrial Security Systems
  (Sistemas de Seguridad Industrial PEMEX)
  Engineer (Ing.) Rafael Fernandez de la Garza, Director Corporativo
  Av. Marina Nacional 329
  Torre Ejecutiva, Piso 35
  1131, Mexico, D.F.
  Tel: 011-52-5-254-4419; 011-52-5-726-1366
  Fax: 011-52-5-545-8090
  Auxiliary Contacts: Srta. Sandra Franco, Secretaria

4.0 DATA INTERPRETATION

4.1 BERMS

The cost estimates presented in Section 3.1 of this document were based on standard construction materials and techniques. A salt core berm which is armored with caliche is not a typical construction effort and as such the cost estimates may vary from actual construction costs. It appears that there may be difficulty in compacting the salt core without the addition of water; however, the salt core is water soluble. Additionally, the compaction of the caliche armor material would also require the addition of water. It seems that if a geotextile were placed over the salt core prior to the placement of the caliche armor this method of construction would both protect the salt core from invasion of water added to the caliche during placement, and allow an adequate amount of water to be added to the caliche which would aid in cementation.

Surface water drainage conduits through the berm were not included in this cost estimate and it is believed that their construction will require great care and possibly increase the berm construction cost by 10% to 20%. Given the 100 year construction method / material testing period set forth in the CCA present construction difficulties would most likely be resolved prior to final construction.

4.2 KIOSKS / MARKERS

According to Mr. Dan Stauty of Cold Spring Granite Company, Cold Spring, Minnesota, and Mr. George Oglesby of Keystone Granite Co. Elberton, Georgia, the trend in the granite quarrying and fabrication industry is towards smaller applications such as granite veneers, granite tiles, and granite facing stones. Because of this trend only a few quarrying operations have the capability of quarrying and fabricating large granite structures. Although the capability to construct large granite monuments is likely to be limited in the future, the supplies of granite are expected to be sufficient. The life span of a typical quarry was reported to be up to 1,000 years.

With current fabrication capabilities it would be difficult to construct granite kiosks as described in the CCA and CCA Appendix PIC. Both of the sources contacted indicated that a two piece granite monument constructed as specified in the CCA and CCA Appendix PIC while feasible to quarry, could not be engraved and handled using conventional techniques. The size of these markers, if constructed to proposed dimensions and configuration would result in a monument weight of approximately 100 to 120 tons. The longest single granite component that could be quarried, handled and engraved would be approximately 12 feet in length. The information provided by those quarries contacted indicated that under present fabrication capabilities the kiosks / markers would be constructed from up to five pieces of granite and yield

the CCA specified dimensions (Appendix C). Additionally the joints between the granite components would be fixed using internal stainless steel anchors. This would allow the proper amount of monument flexibility for wind and other environmental forces. According to Mr. Dan Stauty of Cold Spring Granite, the construction of a metal free monument would be possible but the cost for the engineering design of interlocking components would approximately double the cost of each kiosk / marker.

If the construction of two piece kiosks / markers as described in the CCA and CCA Appendix PIC were a priority, there would likely be additional costs associated with the development and testing of handling technologies that are not currently available in the granite quarrying industry. Without such investment it is unlikely that the industry would develop such capabilities with the current lack of market demand.

The costs for assembly and installation of the kiosks / markers assumes a fairly rapid assembly schedule with foundation excavation occurring on a schedule that would allow uninterrupted kiosk / marker assembly. It would be reasonable to assume that the kiosk / marker components could be delivered and stockpiled on-site until assembly, This would allow an assembly schedule of one kiosk / marker per day with assembly completion in 48 days. If the assembly schedule was delayed, costs could be expected to rise due to standby time for the assembly crew and equipment.

Additionally, the kiosk / marker installation cost estimate assumptions include that the assembly can be completed using standard crane equipment, and all excavation and backfilling of foundations can be completed in one mobilization effort excluding standby time.

4.3 ARCHIVAL OF PRINTED INFORMATION

4.3.1 Printing and Binding

Methods of printing and binding consistent with the requirements of the CCA are presently available and should remain so through the period of interest in the CCA.

4.3.2 Archives

Presently, the only national archive which has agreed to hold the WIPP data is the United States National Archive. National archives in other parts of the world appear to be limited to maintaining data generated within their national boarders. Due to the vagary of national and international political structures and policies determination of the willingness of nations, other than the United States, to house these data is unlikely. Of those nations contacted several suggested that universities and professional societies may be more willing to house the WIPP data. Section 3.3.2 of this document provides information for contacting international archives. These archives were not corresponded with because it was felt that these levels of discussion were best left to the agencies which required storage.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The total volumes calculated for each berm material type were as follows: 1) soil / riprap 129,688 cubic yards (cy); 2) riprap 189,128 cy; 3) caliche 252,892 cy; 4) salt 443,473 cy; and 5) excavated soil 439.747 cy, with the total cost of the berm construction estimated to be $40,043,031.
The total cost of 48 kiosks / markers construction with metal anchors was estimated to be $15,313,723; however, if these same 48 kiosks / markers were constructed with stone interlock the total estimated cost would rise to $28,252,813.

Depending on how the documents are bound (saddlestitched or perfect bound) the cost estimate ranges from $80,500 to $90,750, respectively

The grand total of the cost estimates were $68,401,595 (1997 dollars).

5.2 RECOMMENDATIONS

It seems that if a geotextile were placed over the salt core of the berm prior to the placement of the caliche armor this method of construction would both protect the salt core from invasion of water added to the caliche during placement, and allow an adequate amount of water to be added to the caliche to aid in cementation.

Under present fabrication capabilities the kiosks / markers would be constructed from up to five pieces of granite to yield the CCA specified dimensions. Additionally the joints between the granite components would be fixed using internal stainless steel anchors. This would allow the proper amount of monument flexibility for wind and other environmental forces.

Of those nations contacted several suggested that universities and professional societies may be willing to house the WIPP data. Section 3.3.2 of this document provides information for contacting international archives. These archives were not corresponded with because it was felt that these levels of discussion were best left to the agencies which required storage.

APPENDIX A
WIPP BERM VOLUME CALCULATIONS

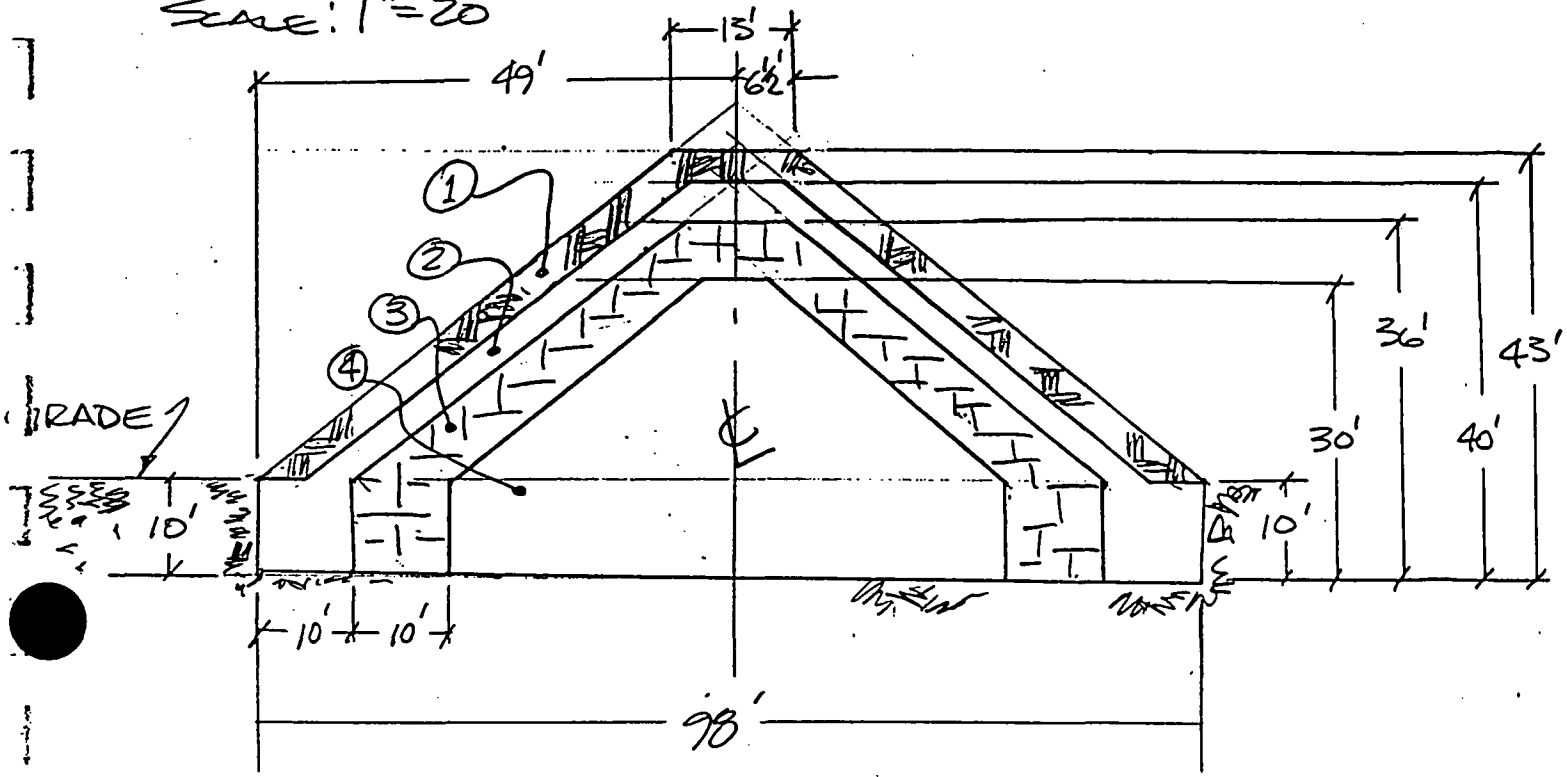
WIPP BERM VOLUME CALCULATIONS

BY: M. WALTERMIRE 2/20/97

PROJECT: A512-002

BERM GEOMETRY SOURCE: CHAP 7, FIG 7-15, P. 7-75
TITLE 40 CFR PART 119 COMPLIANCE CERTIFICATION APPLICATION (CCA)

SCALE: 1" = 20'

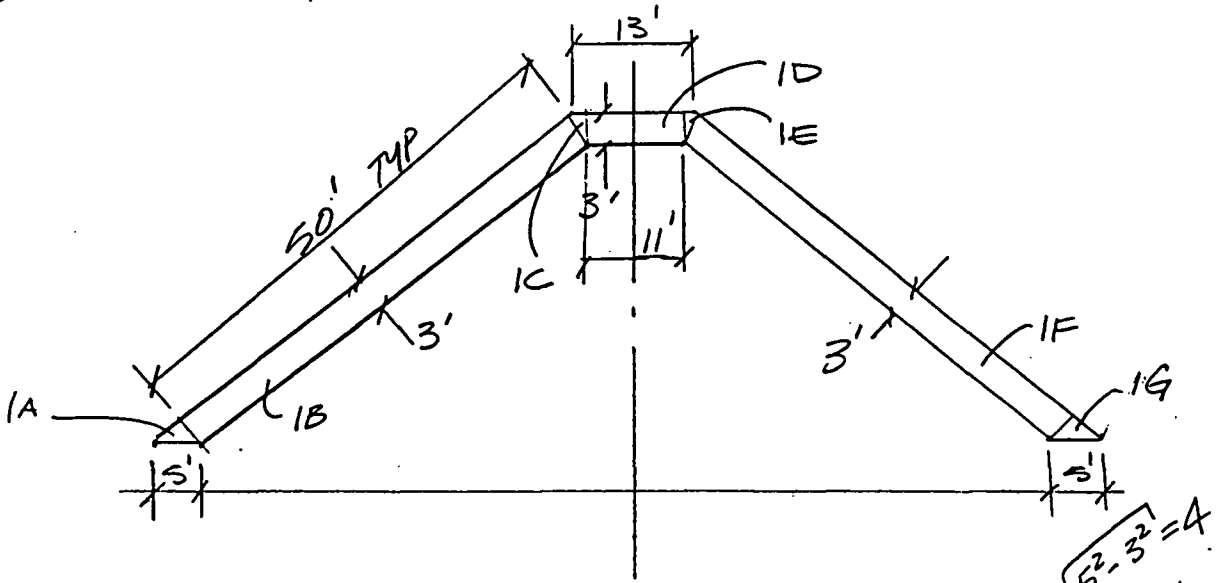


MATERIALS: ① - SOIL/RIPRAP
② - RIPRAP
③ - CALICHE
④ - SALT

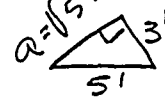
NEED TO CALCULATE AREAS FOR MATERIALS 1 THROUGH 4

WIPP BERM VOLUMES 2/20/07 PAGE 2 OF 8

AREA MATERIAL 1 - SOIL/RIPRAP COVER



$a = \sqrt{5^2 - 3^2} = 4$



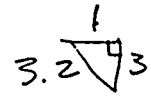
AREAS: $1A = \frac{1}{2}bh = \frac{1}{2}(3)(4) = 6\,FT^2$

$1G = 1A = 6\,FT^2$

$1B = lw = 50 \times 3 = 150\,FT^2$

$1F = 1B = 150\,FT^2$

$1C = \frac{1}{2}(1)(3) = 1.5\,FT^2$



$1E = 1C = 1.5\,FT^2$

$1D = (11)(3) = 33\,FT^2$

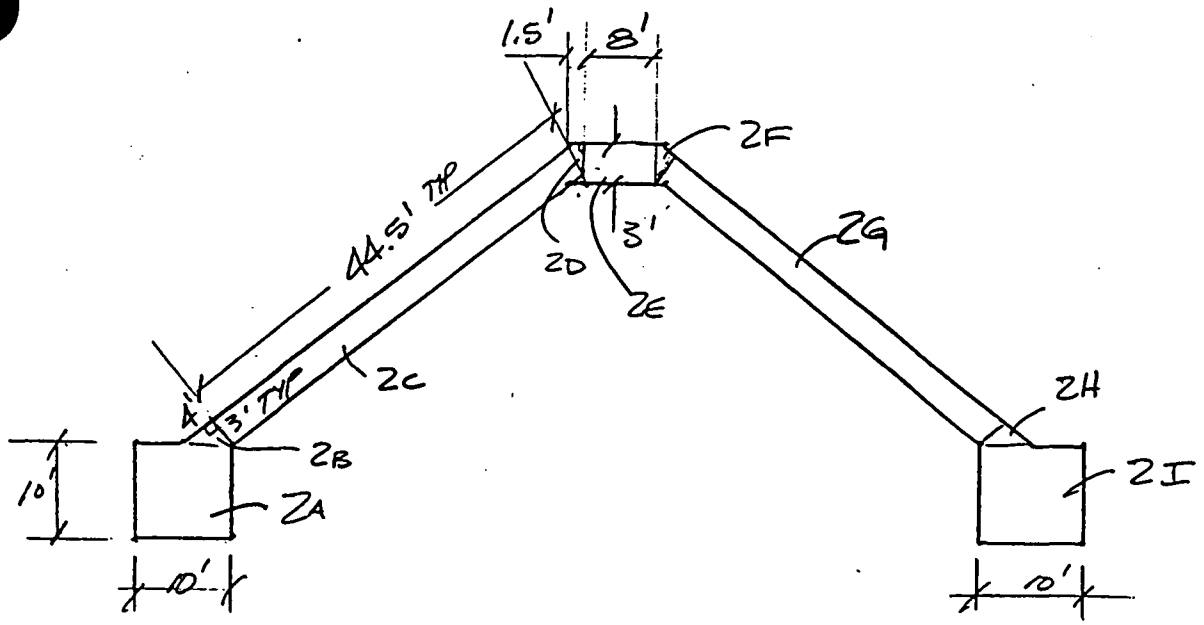
TOTAL AREA = $1A + 1B + 1C + 1D + 1E + 1F + 1G$

MATERIAL 1

$340\,FT^2 = 6 + 150 + 1.5 + 33 + 1.5 + 150 + 6$

WIPP BERM VOLUMES 2/20/97 PAGE 3 OF 8

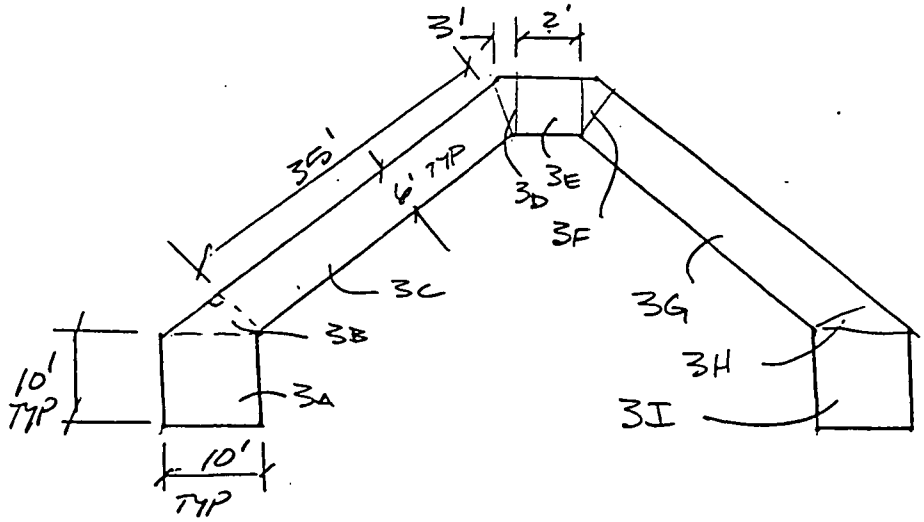
AREA MATERIAL 2 - RIPRAP



AREAS: 2A = (10)(10) = 100 FT² = 2I
2B = 1/2 (3)(4) = 6 FT² = 2H
2C = (44.5)(3) = 133.5 FT² = 2G
2D = 1/2(1.5)(3) = 2.25 FT² = 2F
2E = (8)(3) = 24

TOTAL AREA = 2(100) + 2(6) + 2(133.5) + 2(2.25) + 24
TOTAL AREA = 507.5 FT²
MATERIAL 2

AREA MATERIAL 3 - CALICHE



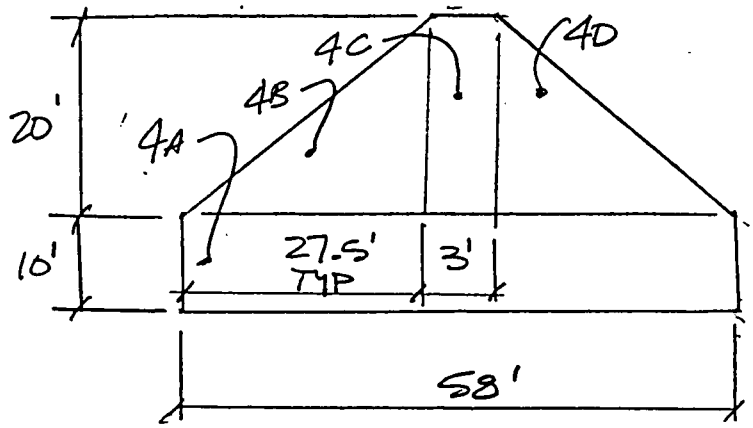
9.5/10 = 3/10

AREAS: 3A = (10)(10) = 100 FT² = 3I
3B = 1/2(3)(9.5) = 14.3 FT² = 3H
3C = (35)(6) = 210 FT² = 3G
3D = 1/2(6)(3) = 9 FT² = 3F
3E = (2)(6) = 12 FT²

TOTAL AREA = 2(100) + 2(14.3) + 2(210) + 2(9) + 12
TOTAL AREA = 678.6 FT²
MATERIAL 3

WIPP BERM VOLUMES 2/20/97 PAGE 4 OF 8

AREA MATERIAL 4 - SALT

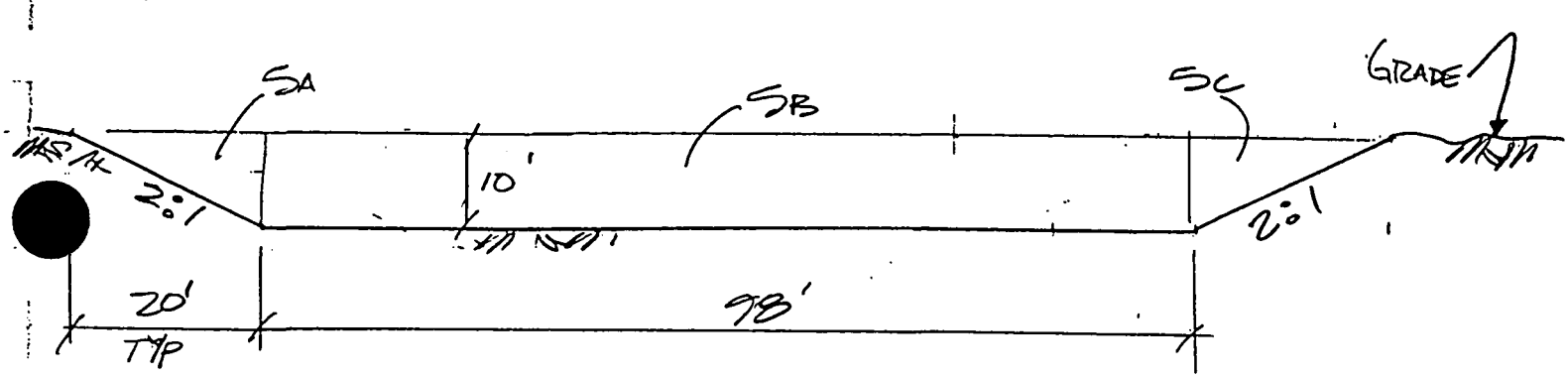


AREAS: 4A = (58)(10) = 580 FT²
4B = 1/2(20)(27.5) = 275 FT²
4B = 4D = 275 FT²
4C = (5)(20) = 60 FT²

TOTAL AREA = 580 + 2(275) + 60

TOTAL AREA = 1190 FT²
MATERIAL 4

BELOW GRADE EXCAVATION AREA



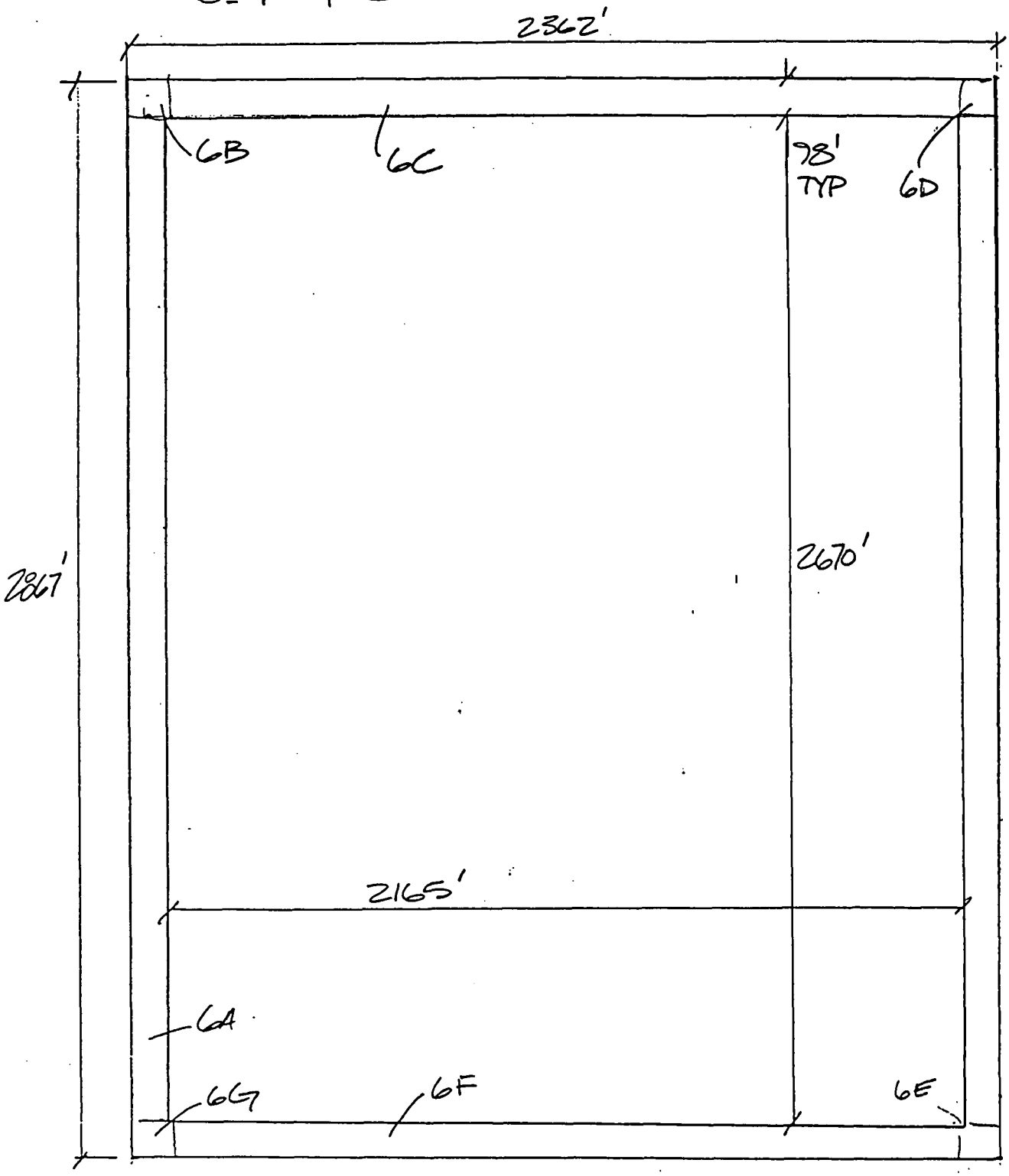
AREAS: 5A = 1/2(20)(10) = 100 FT² = 5C
5B = (98)(10) = 980 FT²

TOTAL AREA = 1180 FT²
EXCAVATION

WIPP BERM VOLUMES 2/20/97 PAGE 5 OF 6

BERM GEOMETRY SOURCE:
CCA, APPENDIX PIC, P. 72, FIG. VIII-2

SCALE: 1"=400'



WIPP Berm Volumes 2/20/97 Page 6 of 8

Volume Calculations

Material 1 — Soil / Rip-Rap

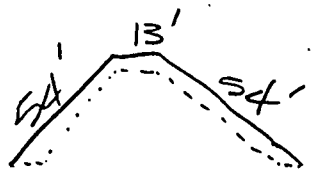
$$V_1 = A_1 (L_{GA} + \ldots + L_{GG}) = 348 FT^2 \underbrace{(2670' + 98' + 2165' + 98' + 2670' + 98' + 2165' + 98')}_{(10062')}$$

$$V_1 = (348 FT^2)(10062 FT) = 3,501,576 FT^3 = 129,688 YD^3$$

Means Heavy Const Cost Data requires Rip Rap Placement calculations in square yards p.59, 022 700 Slope/ Erosion Control - 7/2 0200

Material 1 - Surface Area

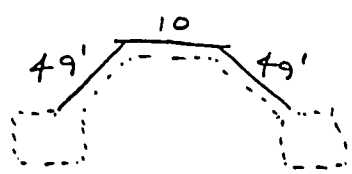
$$SA_1 = (54 + 13 + 54)(10062) = 1,217,502 FT^2 = 135,278 YD^2$$



Material 2 - Rip-Rap

$$V_2 = A_2 (L_{GA} + \ldots + L_{GG}) = (507.5 FT^2)(10062') = 5,106,465 FT^3 = 189,128 YD^3$$

$$SA_2 = (49 + 10 + 49)(10062) = 1,086,696 FT^2 = 120,744 YD^2$$



Material 3 - Caliche

$$V_3 = A_3 (L_{GA} + \ldots + L_{GG}) = (678.6 FT^2)(10062') = 6,828,073 FT^3 = 252,892 YD^3$$

WIPP BERM VOLUMES 2/20/97 PAGE 7 OF 8

MATERIAL 4 - SALT

$V_4 = A_4 (L_{GA} + \ldots + L_{GG}) = (1190 FT^2)(1006 2 FT) = 11,973,780 FT^3$

$443,473 YD^3$

MATERIAL 5 - EXCAVATION

EXCAVATED VOLUME $= (A5_A + A5_B + A5_C)(L_{GA} + \ldots + L_{GG})$

EXCAVATED VOLUME $= (1180 FT^2)(1006 2 FT)$

$= 11,873,160 FT^3$

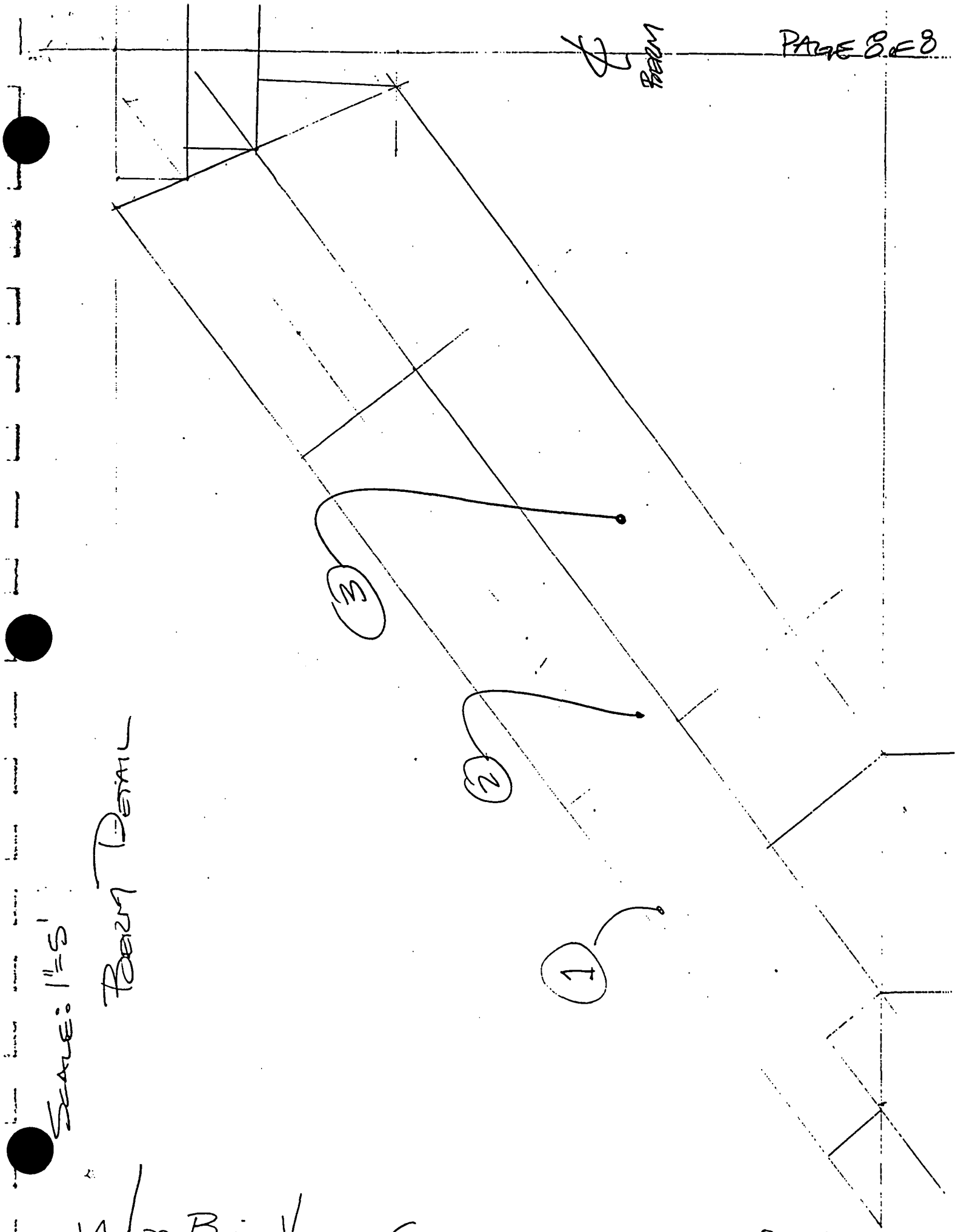
$= 439,747 YD^3$

BACKFILLED NON-BERM VOLUME $= (A5_A + A5_C)(L_{GA} + \ldots + L_{GG})$

$= (200 FT^2)(1006 2 FT)$

$= 2,012,400 FT^3$

$= 74,533 YD^3$



MIPP BERM VOLUME CALCULATIONS

APPENDIX B
WIPP BERM COST CALCULATIONS

WIPP BERM COSTS 3/5/97 PAGE 1 OF 5
BY: M. WALTERMIRE
PROJECT: AS12-002

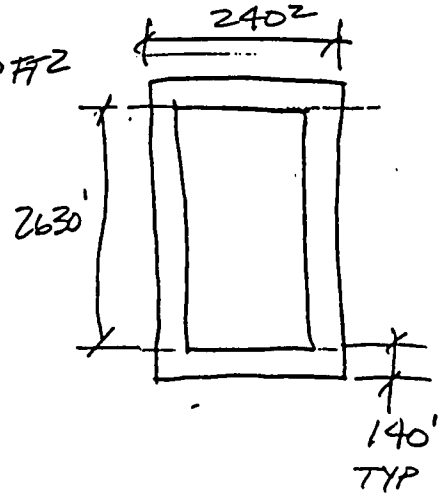
ACTION 1 - CLEAR & GRUB AREA

MEANS P. 41, 021 104 0010 CLEAR & GRUB, TREES TO 6" DIA
$2,900/AC

AREA TO BE CLEARED & GRUBBED

BERM FOOT PRINT + 20' EACH SIDE OVEREXCAVATION

$A = [(2)(240')(140')] + [(2)(2630')(140')] = 1,408,960 FT^2$
$= 32.3 AC$



COST = (32.3 AC)($2,900/AC)
= $93,801

ASSUME 5 MILES OF HAUL ROAD
TO BE CLEARED AT 30' WIDE

$A = (5)(5280')(30') = 2,376,000 FT^2$
$= 54.5 AC$
COST = (54.5 AC)($2,900/AC)
= $158,182

TOTAL COST ACTION 1 = $251,983

ACTION 2 - GRUB STUMPS AND REMOVE
MEANS P. 41, 021 104 0150 @ $1,300/AC

COST = (A BERM + A ROAD)(COST/AC)
COST = (32.3 AC + 54.5 AC)(1,300/AC)
COST = $111,540

WIPP BERM COST 3/5/97 PAGE 2 OF 5

ACTION 3 - STRIPPING TOPSOIL & STOCKPILING, SANDY LOAM
MEANS P. 42, 021 144 0100 @ $1.22/CY

200 HP DOZER ADVERSE CONDITIONS

BERM EXCAVATION - 439,747 YD³

COST = (439,747 YD³)($1.22/YD³)
= $536491

ASSUME 1' OF ROAD MAT'L IS ALSO STRIPPED
ROAD VOLUME = (1 FT)(2,376,000 FT²)
= 2376000 FT³
= 88,000 YD³
COST = (80,000 YD³)($1.22/YD³)
= $97,600

TOTAL COST ACTION 3 = $634,091

ACTION 4 - HAULING MATERIAL 4 - SALT
MEANS. P. 54, 022 266 500 @ $4.91/YD³
4 mi ROUND TRIP (RT) 12 YD³ DUMP
ASSUME: 1.4 BULKING FACTOR
COST = ¼ (1.4) (COST/YD³)
= (443,473 YD³)(1.4)($4.91/YD³)
= $3,048,433

ACTION 5 - BACKFILLING MATERIAL 4 - SALT
MEANS P. 47, 022 208 5420 @ $1.37/YD³
300' HAUL, CLAY W/ 300 HP DOZER OR FRONT END LOADER
ASSUME: 1.4 BULKING FACTOR

COST = (443,473 YD³)(1.4)($1.37/YD³)
COST = $850,581

WIPP BERM COST 3/6/97 PAGE 3 OF 5

ACTION 6 - COMPACTING MATERIAL 4-SALT
MEANS P.48, 022 226 5720 @ $0.41/YD³
SHEEPSFOOT, 12" LIFTS, 4 PASSES
ASSUME: BULKING FACTOR IS 1.4
COST = (443,473 YD³)(1.4)($0.41/YD³)
COST = $254,553

ACTION 7 - HAULING SCREENED MATERIAL 3-CALICHE
MEANS P.152, 041 000 932 0250 @ $26/YD³
SCREENED & WASHED SAND W/ 10 MILE HAUL
ASSUME: AS PER P.67 OF PIC - 30%-40% OF CALICHE SHOULD PASS THROUGH A NUMBER 200 SIEVE. ALSO 1.4 BULKING FACTOR
COST = (252,892 YD³)(1.4)($26/YD³)
COST = $9,205,269

ACTION 8 - BACKFILLING MATERIAL 3-CALICHE
MEANS P.47, 002 208 5420 @ 1.37/YD³
300' HAUL, CLAY W/ 300 HP DOZER OR FRONT END LOADER
ASSUME: 1.4 BULKING FACTOR

COST = (252,892 YD³)(1.4)(1.37/YD³)
COST = $485,047

ACTION 9 - COMPACTING MATERIAL 3-CALICHE
SEE ACTION 6 @ $0.41/YD³
COST = (252,892 YD³)(1.4)($0.41/YD³)
COST = $145,160

ACTION 10 - HAULING MATERIAL 2-RIP-RAP
MEANS P.54, 022 200 266 0560 @ $23/YD³
12 YD³ DUMP TRUCK, 20 MILE ROUND TRIP
ASSUME: BULKING FACTOR 1.2

COST = (189,128 YD³)(1.2)($23/YD³)
COST = $5,219,932

NIPP BERM COST 3/6/97 PAGE 4 OF 5

ACTION 11 - PLACING MATERIAL 2 - RIP RAP

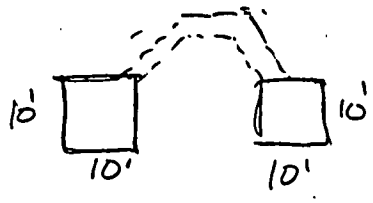
MEANS P.59, 022 700 712 0200 @ $61.50/YD²
18" MIN THICKNESS, NOT GROUTED

COST = (120,744 YD²)($61.50/YD²)
COST = $7,425,756

ACTION 12 - BACKFILLING MATERIAL 2 - RIP RAP (END SECTIONS)

SEE ACTION 5 @ $1.37/YD³

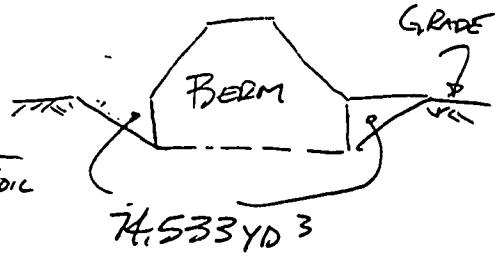
VOLUME = [(10')(10') + (10')(10')][10062']
V = 2012400 FT³
V = 74,533 YD³



COST = (74,533 YD³)($1.37/YD³)
COST = $102,110

ACTION 13 - BACKFILL MATERIAL 5 - EXISTING SOIL (END SECTIONS)

SEE ACTION 5 @ $1.37/YD³
ASSUME: 1.4 BULKING FACTOR
COST = (74,533 YD³)(1.4)($1.37/YD³)
COST = $142,954



ACTION 14 - COMPACTING MATERIAL 5 - EXISTING SOIL

SEE ACTION 6 @ $0.41/YD³
COST = (74,533)(1.4)(0.41) = $42,781

ACTION 15 - HAUL MATERIAL 1 - SOIL/RIP. RAP

SEE ACTION 10 @ $23/YD³
ASSUME: BULKING FACTOR 1.2
COST = (129,688 YD³)(1.2)($23/YD³)
COST = $3,579,389

ACTION 16 - PLACE MATERIAL 1 - SOIL/RIP. RAP

SEE ACTION 11 @ $61.50/YD²
COST = (135,278 YD²)($61.50/YD²)
COST = $8,319,597

WIPP BERM COST 3/7/97 PAGE 5 OF 5

ACTION 17 - SEEDING BERM & ADJACENT DISTURBED AREAS
MEANS P.116, 029 300 308 5400 @ $49/MSF (THOUSAND FT²)
HYDRO OR AIR SEEDING, W/ MULCH AND FERTILIZER

BERM FOOT PRINT + HAUL ROAD = 1,408,960 FT² + 2,376,000 FT²
= 3,784,960 FT²

ASSUME: 1.2 TIME THE INTENDED DISTURBED AREA REQUIRED

COST = (3,784,960 FT²)(1.2)($0.049/FT²)

COST = $222,555

TOTAL COST ALL ACTIONS

ACTION	COST	REMARKS
1	251,983	CLEAR & GRUB
2	112,840	GRUB STUMPS
3	634,091	STRIP & STOCKPILE SOIL
4	3,048,433	HAUL SALT
5	850,581	BACKFILL SALT
6	254,553	COMPACT SALT
7	9,205,269	HAUL SCREENED CALICHE
8	485,047	BACKFILL CALICHE
9	145,160	COMPACT CALICHE
10	5,219,932	HAUL RIP-RAP
11	7,425,756	PLACE RIP-RAP
12	102,110	BACKFILL RIP-RAP END SECTIONS
13	142,954	BACKFILL EXISTING SOIL
14	42,781	COMPACT EXISTING SOIL
15	3,579,389	HAUL SOIL/RIP-RAP
16	8,319,597	PLACE SOIL/RIP-RAP
17	222,555	RE SEED
	$40,043,031	

APPENDIX C
PROPOSED MARKER CONSTRUCTION
&
COST CALCULATIONS

COLD SPRING GRANITE
PROPOSAL & CONTRACT (Material Supply Only)

202 S. 3rd Avenue
Cold Spring, MN 56320
800-328-5040
320-685-8490 FAX

DATE: 03-11-1997
ATTN: Paul Wharry
COMPANY: RESEARCH MANAGEMENT CONSULTANTS
1746 Cole, Suite 300
Golden, CO 80401
FAX: 303-277-0055 303-277-0066

PROJECT: MONUMENT
LOCATION: Albuquerque, NM
JOB NUMBER:

Unless revoked earlier in accordance with the attached Terms & Conditions, this quote expires after 30 days.

COLD SPRING GRANITE COMPANY (Hereinafter "Seller") of Cold Spring, MN. proposes to furnish materials as described below.
The following bid documents, drawings & specifications will be referred to as Contract Documents and shall apply insofar as these documents do not conflict with the terms and conditions of this contract.

Cold Spring Granite to supply a cubic monument, a total of 5 pieces, per RMCI's four page fax dated 3-6-97 and attached sketch, Exhibit "A", dated 3-11-97. Finish will have wire movement, no grinding, thermal finish applied to ease wire markes and help eliminate future rust problems. Finished piece size dimensions could be +/- 1/4" or better.

Unit Pricing-1 1/2" high sandblast incised & hilited letters $3.85 each
-1 1/2" high tooled V-cut & hilited letters $7.00 each

Attached Terms & Conditions are part of this proposal.

TYPE OF MATERIAL: Rockville White
FINISH: Thermal

Contract Documents, so far as they relate to material listed herein, are made a part of this Contract. Notwithstanding anything to the contrary in the Contract Documents, Seller will provide only materials ready to set and will not provide shelf angles, caulking, testing, engineering, support steel, mockups or setting.

Seller's Standard Anchors are Included: YES ■ NO ☐ Seller's Shop Drawings are included: YES ■ NO ☐

Price: $ 255,359.00 Tax:$ 14,205.62 Total Amount: $ 269,564.62

Materials to be delivered F.O.B. Albuquerque, NM
City, State, Zip

NOTE: Change of delivery address may affect applicable tax rate.

■ Above price(s) INCLUDE all applicable State & Local Taxes, at a combined rate of 5.563 %.
☐ Above price(s) DO NOT include applicable State or Local Taxes. However, all State & Local Taxes are to be added to the price shown to establish Contract price unless an appropriate exemption, direct pay, or resale certificate is provided.

PAYMENT TERMS: Paid as fabricated, net 30 days, no retainer.
(Subject to Credit Approval)

SHOP DRAWINGS 2-3 SHOP TICKETS _____ (Weeks for initial submission.)

DELIVERY: Start delivery 6 mo. weeks after receipt of approved shop drawings or cutting lists with all necessary cutting information & returned signed Contract. Balance of delivery per mutually agreed upon schedules for shop drawing submissions, approvals, and fabrication time.

THIS PROPOSAL & CONTRACT FOR MATERIAL INCORPORATES ALL OF THE TERMS & CONDITIONS PRINTED ON THE FRONT & BACK HEREOF INCLUDING ANY ATTACHMENTS.
Buyer hereby accepts Seller's offer to sell & agrees to perform in accordance with all terms & conditions. Buyer, by acceptance of the first delivery of material, will be deemed to have accepted all terms & conditions contained herein regardless of whether this document has been executed by Buyer.

ROBERT CROWNOVER (800-247-2637)
COLD SPRING GRANITE COMPANY

ACCEPTED BY BUYER:
RESEARCH MANAGEMENT CONSULTANTS
BUYER:

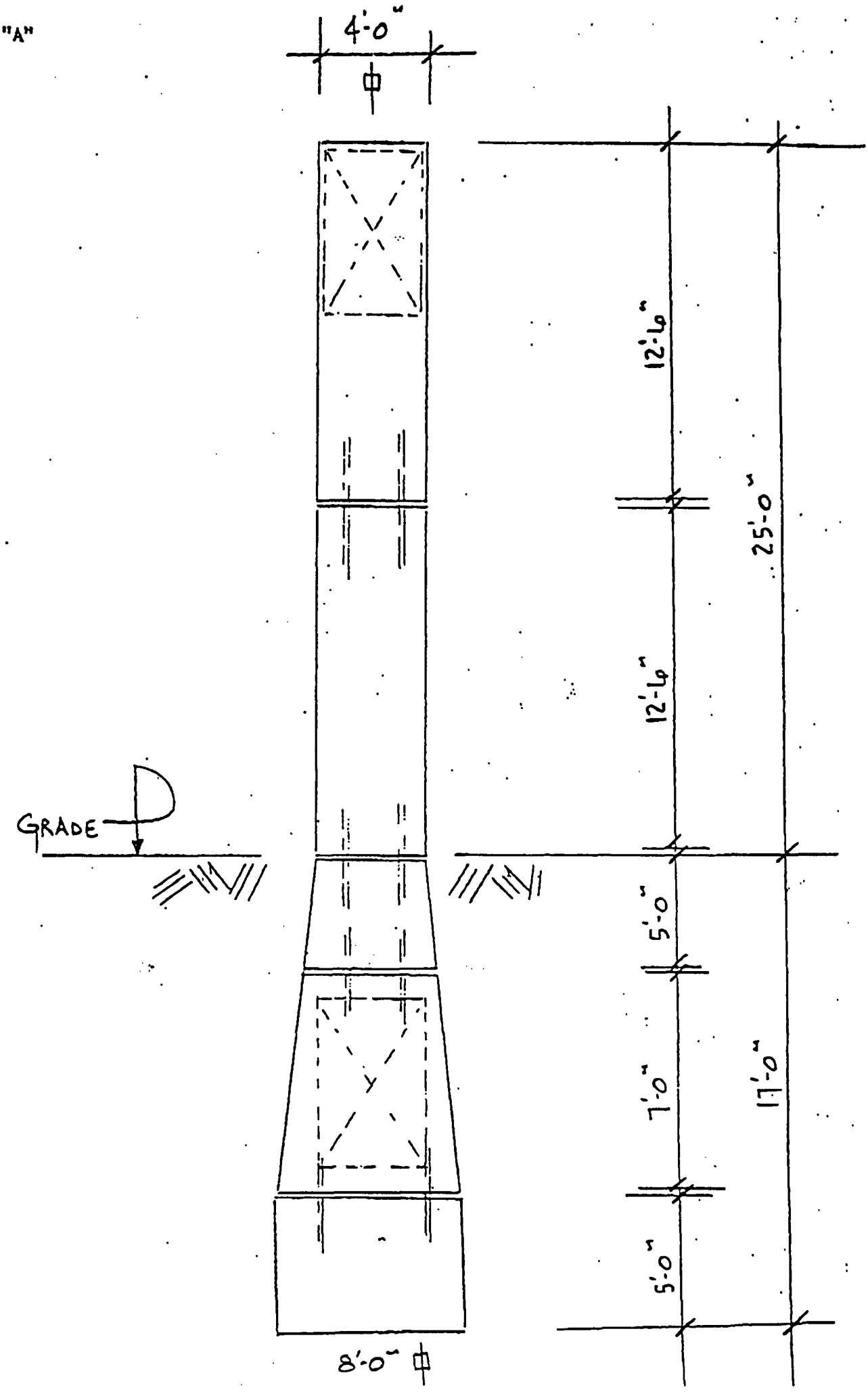
KATHY SILVERS Kathy Silvers
PROPOSED BY: SALESPERSON

SIGNATURE: (Officer or Authorized Rep) DATE

ACCEPTED BY: Gary Theisen, Asst. Treasurer DATE 3/7

PLEASE SIGN & RETURN ALL COPIES

EXHIBIT "A"
3-11-97



TERMS AND CONDITIONS

1. **DELIVERY, SHIPPING & LIMITATION OF LIABILITY:** Buyer agrees to inspect all granite before unloading, and in case of transit damage, will substantiate claim against carrier by noting all damage (including marks and numbers on the damaged pieces) on the freight receipt before removal from trucks or cars. Unless such specific notations are made, any granite unloaded will be considered as delivered in good condition. Seller will not be liable for any delay or failure to make delivery occasioned in whole or part by the owner, architect, general contractor, Buyer or any of Buyer's subcontractors or materialmen or by any causes beyond Seller's control, including, without limitation, failure to return approved shop drawings to Seller on schedule, strikes, lockouts, fire, embargoes, war or other outbreak of hostilities, inability to obtain shipping space, governmental acts and regulations, accidents, acts of God or other conditions beyond Seller's control. Method and route of shipment to be determined by Seller. The cost of transportation shall be borne by Buyer. In the event of any delay not excused as provided above, Seller's liability shall be limited as provided for in Paragraph 2.

2. **WARRANTIES, LIMITATIONS & INDEMNIFICATION:** Seller warrants to Buyer that the materials provided by it will conform to these terms and conditions and/or to approved shop drawings and will be free of defects in materials, except as provided in Paragraph 3 and workmanship. Seller specifically disclaims responsibility for design and engineering. This warranty shall not extend more than one year after delivery of the specific materials involved. The sole and exclusive remedies for breach of this warranty shall be, at the Seller's discretion, correction of the materials, replacements of the materials F.O.B. point of shipment, refund of the amount by which the value of the materials is diminished by the breach of warranty, or any combination of these alternatives; provided the nonconformity or defects is due to Seller's fault and is not the result of abuse, misuse, mishandling, accident or other event outside Seller's control and provided that Buyer gives written notice of any nonconformity of defect within seventy-two (72) hours after Buyer learns of the breach or ninety (90) days after the specific materials involved are delivered, whichever is earlier.

   Buyer accepts the above conditions as reasonable limitations on any right of recovery. IN THE EVENT OF BREACH OF THIS CONTRACT BY SELLER, BUYER SHALL NOT BE ENTITLED TO RECOVER CONSEQUENTIAL OR LIQUIDATED DAMAGES. SELLER EXPRESSLY LIMITS INDEMNIFICATION OF OTHER PARTIES TO DIRECT DAMAGES CAUSED SOLELY BY THE NEGLIGENCE OF SELLER. The warranty provisions set forth in this paragraph are in lieu of all other remedies against Seller for consequential, incidental or other damages, notwithstanding anything to the contrary in the contract documents. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE MADE IN CONNECTION WITH THE SALE OF MATERIALS UNDER THIS AGREEMENT.

   In addition: If Buyer is not the project owner, and does not ensure that these warranty limitations are accepted by, and made a part of the contract with the owner and any other party with whom the Buyer has a contract relating to the project for which the materials hereunder are provided, then Buyer shall indemnify and hold Seller harmless from any and all claims, demands, loss or liability in excess of the obligation Seller would have had under its limitations.

3. **NATURAL MATERIAL:** Buyer acknowledges that stone is a natural material with variations in color and other characteristics and agrees to accept such natural variations and color ranges indicated by samples, mockups or photos.

4. **BACK CHARGES:** Buyer agrees that it will not have the right of offset against the contract price or the right to back charge the contract unless Buyer has given prompt written notice and Seller has given its written consent.

5. **LIEN WAIVERS:** Seller will furnish interim partial lien waivers for payments received. Seller agrees to furnish a final release of lien upon receipt of final payment. Seller will file pre-lien notice if appropriate.

6. **BUNDLING:** Bundling will be per Seller's standard bundling procedures.

7. **GRANITE FABRICATION:** Seller's fabrication will be in accordance with National Building Granite Quarries Association, Inc. Specifications. Orders for dimensional stone include joint and layout coverage. Net shipped footage may not equal gross estimated footage.

8. **GRANITE THICKNESS:**

3/8" nominal = 3/8" +/-1/32"	2" nominal = 2" +/-1/4"
1/2" nominal = 1/2" +/-1/16"	3" nominal = 3" +/-1/4"
7/8" nominal = 7/8" +/-1/8"	4" nominal = 4-1/4 +/-1/4"
1-1/4" nominal = 1-1/4" +/-1/8"	6" nominal = 6-3/8" +/-1/4"
	8" nominal = 8-5/8" +/-1/4"

   Exposed edges shall be gauged at minimum modular thickness or less.

9. **FIELD MEASUREMENTS:** Seller shall not be responsible for making, verifying, or ensuring the accuracy of field measurements for the materials sold hereunder nor for any loss or damage arising as a result of inaccurate field measurements or discrepancies between information supplied by Buyer and actual field dimensions.

10. **SHOP DRAWINGS:** If prepared by Seller, shop drawings will be submitted to Buyer for approval prior to fabrication. Shop drawings will show stone and immediate stone anchorage only. Detailing of other support systems components is excluded.

    If prepared by Buyer, shop drawings will be forwarded to Seller marked "APPROVED FOR FABRICATION" before fabrication will commence.

    If shop drawings are not required, sizes listed in scope of work are approved for fabrication and no shop drawings will be sent.

11. **ANCHORS:** If supplied by Seller, Seller's STANDARD anchors and appropriate cutting/routing of stone to receive anchors is included in Contract Price. Standard anchors are to be of type 302 or 304 stainless steel, and are considered to be only those anchors penetrating the stone.

    When Buyer supplies anchors, Buyer may encounter added cost should such anchors require other than Seller's standard anchor holes or slots.

    Clip angles, shelf angles, aluminum extrusions, miscellaneous metal framework, expansion bolts, shims, flashing, sealants, and other such appurtenances are excluded.

12. **ENGINEERING & DESIGN:** Engineer's calculations (sealed or unsealed) or engineer's seal on shop drawings are specifically excluded.

    Seller will not be responsible for any engineering any/or design with regard to the work on this project. Shop drawings, if provided by Seller, will show stone anchoring methods and/or design concepts which must be approved by Buyer within the context of the overall engineering and design requirements of the project.

13. **TESTING:** Copies of existing laboratory test data will be made available for review at no cost. If any additional testing is required, Buyer will be responsible for laboratory fees as well as the cost of the granite and/or other components used as test specimens.

14. **MOCKUPS:** Cost of visual or performance mockup is excluded. All costs associated with the supply, erection, and testing of any required mockup materials are excluded.

15. **PAYMENT, PERFORMANCE, OR SUPPLY BONDS:** No bonds are included in Contract Price, Payment, Performance and/or Supply Bonds, if required, will be provided at Buyer's expense.

16. **PUBLIC PROJECTS:** Buyer must supply Seller with a copy of Buyer's Labor and Material Payment Bond prior to initial shipment of material on public projects.

17. **INSURANCE COVERAGE:** Seller carries general liability insurance, covering bodily injury and property damage. Additional or supplementary coverage requested by Buyer, but not contained in Seller's current policies are excluded and may or may not be available. If available, Seller will provide at Buyer's expense.

18. **SUPERSEDING CLAUSE:** This document contains the terms and conditions upon which Seller offers this quotation for materials and/or services on the project referred to herein. Buyer hereby acknowledges that the terms and conditions contained in this document supersede all conflicting or otherwise inconsistent terms and conditions contained elsewhere.

19. **CHANGE ORDERS & REPLACEMENT PIECES:** Change orders and replacement pieces shall be priced separately from the base contract and Seller will not begin work on any change order or replacement piece without the order and price being put in writing and the Buyer's written acknowledgement of the order.

20. **INVOICES & PAYMENT:** Invoices for materials sold hereunder will be provided to Buyer monthly as material is fabricated. Terms are net 30 days from date of invoice unless other terms are specifically agreed to in writing. Payments not received by Seller within thirty (30) days of the date of invoice shall bear interest at the rate of eighteen percent (18%) per annum, compounded daily, or the maximum rate permitted by law, whichever is less. Payments are due within thirty (30) days whether or not delivery of material has been made or whether Buyer has been paid by the owner or other contractor. Any charges against either party are to be accounted for and settled on a monthly basis. Failure of Buyer to pay Seller in accordance with these payment terms or other payment terms agreed to in writing relieves Seller of an obligation to ship additional material to Buyer. Further, Seller and Buyer agree that this contract is then modified, and Seller may, in its own discretion, then require payment by Buyer before shipment of any future materials.

21. **NO RETAINAGE:** Seller's price is based upon prompt and full payment by Buyer of Seller's invoices. No retainage of payment by Buyer is permitted under the terms of this contract. Any unauthorized retention of payments by Buyer will relieve Seller from its obligations pertaining to fabricating and shipping subsequent product.

22. **ASSIGNMENT:** This agreement may not be assigned by Buyer without the written consent of Seller.

23. **SEVERABILITY:** If any provision of this agreement is determined to be unenforceable or invalid, the unenforceable or invalid part hereof shall be deemed severed from this agreement, and the remaining portions of this agreement shall be carried out with the same force and effect as if the severed portions had not been part of this agreement.

24. **ESCALATION:** Seller's quoted prices are based upon fabrication and shipping in reasonable accordance with Buyer's intended schedule. Shipment delayed for reasons beyond the control of Seller may be subject to escalation, and Buyer agrees to negotiate in good faith and adjustment to the price of such extended delays.

25. **APPLICABLE LAW:** This agreement shall be governed by the laws of the State of Minnesota, and any and all rights and obligations under this Agreement, including matters of construction, validity and performance, obligations, and conflict of laws, shall be governed by the laws of the State of Minnesota and no other jurisdiction. Further, if any dispute arises out of, or in connecton with this Agreement, both parties hereto agree to bring suit only in a Minnesota state court located in the County of Stearns, State of Minnesota. BOTH PARTIES HERETO IRREVOCABLY ADMIT TO, AND CONSENT TO, THE JURISDICTION OF SAID STATE COURT. Violation of this covenant will bar recovery by BUYER in any other court.

26. **CANCELLATION OR RESTOCKING CHARGE:** Orders cancelled by Buyer will be subject to a cancellation or restocking charge. Cost will include fabrication and/or administrative expense. Buyer agrees to pay Seller's invoice.

Kiosk / Marker Implementation Costs

Marker fabrication as per cost estimate provided five piece construction with metal anchors and delivery to Albuquerque NM. 269,564.62 Each x (16+32 markers) = **$12,939,102**

Marker fabrication five piece construction with engineering for interlock connection and no internal metal with delivery to Albuquerque NM. $539,129 Each x (16+32 markers) = **$25,878,192**

Engraving 1170 characters plus 8 for figures on eight sides.
1178 characters x 8 sides x $3.85 per character x (16+32 markers) = **$ 1,741,555**

Excavation of foundations 17 feet deep by 8 feet by 8 feet x 2 = 2176 cubic feet = 80 cubic yards

Excavation costs, common earth, page 346 Means cost data guide, site work & landscape

$6.46 per cubic yard, $6.46 per cy x 80 cy x (16+32 markers) = **$24,806**

Backfill costs, common earth, page 356 Means cost data guide, site work & landscape

$3.88 per cubic yard estimate that only 2/3 the excavated volume will need to be backfilled because the remainder is occupyed with the stone marker.

(80 cy x 70%) x (16+32 markers) x $3.88 per cy = **$ 10,429**

Marker installation and handling on site,

Assume crew C-24 or equivalent, page 404 Means cost data guide, heavy construction
2 foremen, 6 workers, 2 equipment operators, 1 truck crane, 136 ton. $5,080.60 daily
plus $1,200 mobilization cost. Assume work to be completed at one marker per day for a total of 48 days.

$5,081 per day x 48 days + $1,200 mob = **$245,088**

Marker Unloading and transport on site
Means cost data guide, heavy construction

One truck for hauling monument sections
$ 4,800 per month 2.5 month rental = $12,000
plus 1 truck driver at $170.40 per day x 48 days = $8,179

Plus 1 crane for 2.5 months at $ 11,100 per month = 2.5 months x $11,100 per month = $ 27,750
plus one operator at $16,320 for 48 days plus one crane hookup helper at $10,213 for 48 days
plus $1200 mobilization and demob

$4,800 +$8,179 + $27,750 + $16,320 + $10,213 + $1,200 = **$52,142**

Transport to site, truck compny cost estimate, OMNI Transportation Services
tranport for one stone at 20 tons from Albuquerque to Carlsbad $1,250

$1,250 per piece x 5 pieces per marker x (16+32 markers)= **$ 300,000**

APPENDIX D
PRINTING COST ESTIMATE

A.B. Hirschfeld Press, Inc.
5200 SMITH ROAD • DENVER, CO 80216
PHONE (303) 320-8500

March 5, 1997

Ladd Hastings
RMCI
1746 Cole Blvd., Suite 300
Golden, CO 80401

I am pleased to confirm your specifications and pricing for the following:

Estimate Ref:	PH - ARM3111
Description:	Books, perfect bound or saddlestitched
Quantity:	100 sets of 50 volumes, each volume consisting of 100 pages text and a 4-page cover
Trim Size:	8½ x 11
No. of Pages:	500,000 total text pages ; 20,000 total cover pages (front, inside front, inside back, back)
Paper:	Text: 70# Archiva Starwhite Vicksburg wove book Cover: 80# Archiva Starwhite Vicksburg wove cover
Preparation:	Client provides camera-ready copy; ABH provides film and bluelines.
Printing:	Text: K/K Cover: K/0 Text and cover both printed with carbon black ink with pH in excess of 5.5
Finishing:	Perfect bind or saddlestitch; carton pack 100 sets of 50 volumes each.
Distribution:	FOB Denver
Production:	Schedule to be determined.
Price:	Perfect Bound: $90,750 Saddlestitch: $80,500
Taxes:	Plus applicable sales taxes

NOTE: This quotation is based on production in 1997 and is subject to credit and schedule approval and availability of manufacturing time. Paper is quoted at current mill prices in effect at time of quotation and is subject to availability. Paper prices will be adjusted to reflect current market costs at time paper is manufactured. Any additional units of work required by the Customer or changes in conditions which are not specifically covered in this quotation will be priced prior to work being performed and upon approval from the Customer will be invoiced accordingly. Customer's alterations, if required, will be billed additionally.

I look forward to working with you.

Submitted by: Perry Hubert
Perry Hubert
Sales Representative

Accepted: _____

Date: _____

Helping People Make Their Best Impressions

Sin 1905

APPENDIX E
NARA BULLETIN NUMBER 95-7

*** Last update 9/15/95 ***

National Archives and
Records Administration
Washington, DC 20408

NARA BULLETIN

NO. 95-7

September 8, 1995

TO: Heads of Federal agencies

SUBJECT: Procurement of writing, copying, and printing papers for Federal records

1. Purpose. This bulletin advises agencies to procure permanent and alkaline paper grades routinely to create all Federal records. This recommendation complies with Public Law (Pub.L.) 101-423, Executive Order (E.O.) 12873, and Environmental Protection Agency (EPA) guidance. Information on cost and availability of paper grades is also provided.

2. Expiration. This bulletin expires September 30, 1997.

3. Background.

a. Papers used for most documents and publications since the mid-nineteenth century were highly acidic. The acid in these papers greatly accelerates their deterioration and is a principal threat to our documentary heritage. In the past, the cost of acid-free papers was generally prohibitive. In recent years, the pursuit of inexpensive papermaking techniques has resulted in an increasing replacement of acidic pulps with more economical alkaline pulps. Fortunately, the alkaline process also extends paper life by many decades.

b. Public Law 101-423, A Joint Resolution to Establish a National Policy on Permanent Papers, establishes as the policy of the United States that Federal records, books, and publications of enduring value be produced on acid-free permanent papers. The Joint Resolution further recommends that Federal agencies require the use of acid-free permanent paper for publications of enduring value produced by the Government Printing Office or by Federal grant or contract, using the specifications for such paper established by the Joint Committee on Printing; and that agencies require the use of archival quality acid-free papers for permanently valuable Federal records and confer with NARA on the requirements for paper quality.

c. Executive Order 12873, "Federal Recycling, Acquisition, and Use of Environmentally Preferable Products and Services," section 504, and EPA's Recovered Materials Advisory Notice (60FR21386) establishes minimum percentages for recovered waste and post-consumer waste for printing and writing papers. Although many permanent and alkaline papers contain a significant percentage of recycled material, most do not meet the percentages specified by the E.O. and EPA's guidance. However, sections 502(2) and 504(1) of the E.O. authorize agencies to select papers that do not meet content percentages when available items fail to meet reasonable performance standards.

4. Definitions.

a. Alkaline paper. Paper that will last for at least one-hundred years under normal use and storage conditions. Alkaline paper grades are groundwood-free with a minimum pH of 7 and an alkaline reserve of 2% or more.

b. Generic paper. Paper without a specified pH or alkaline reserve. Longevity of generic paper varies and is uncertain. Many last for 50 to 100 years.

c. Permanent paper. Paper that will last for several hundred years without significant deterioration under normal use and storage conditions. Permanent paper grades are groundwood-free with a pH of 7.5 or above, an alkaline reserve of 2% or more, and other strength or performance properties that guarantee the use and retention of records generated on this paper for a maximum period of time.

5. Agency action.

a. Agency heads should direct records officers and officials who administer procurement, printing, and supply distribution to jointly develop policy and procedures to procure and use permanent and alkaline papers for both permanent and temporary Federal records. Copies of this bulletin are being distributed to agency records, printing, and procurement officials.

b. Because it is difficult to distinguish between permanent, alkaline, and generic papers, or to determine at the moment of creation how long a document will be maintained, agencies may choose to stock only one type of paper grade in individual office units (or agency-wide) for routine use in photocopiers, laser printers, telefacsimile equipment, etc.

(1) Permanent paper is recommended for routine use in office units that create and file a high proportion of long-term and permanent records.

(2) Alkaline paper is recommended for routine use throughout agencies for all documents.

c. Publications intended for long-term use in a paper format by many recipients, such as those that are placed in multiple Federal, State, and local government depositories' core collections in libraries and offices, should be created on permanent or alkaline paper. Generic paper is suitable for mass publications such as press releases and telephone directories; however, if the record set of a publication has long-term value, a file copy should be created by (1) photocopying onto alkaline or permanent paper, (2) maintaining an electronic version, or (3) creating a microform version from the paper or from Computer Output Microform (COM).

d. NARA also suggests the following techniques to reduce paper consumption and/or waste:

(1) Employ electronic systems to create, distribute, and maintain documents in accordance with 36 CFR part 1234.

(2) When paper is the selected format for Federal records:

- Make two-sided copies.
- Use letter-size instead of legal-size paper.
- Use envelopes without plastic windows and self-adhesive glue. Adhesives and plastics cannot readily be recycled with paper.

6. Cost and availability of paper for Federal records.

a. In recent years, the cost of permanent paper was two to four times more than generic paper and the cost of alkaline paper was one-third more than generic paper. However, a recent survey showed only a 5% difference between comparable permanent, alkaline, and generic xerographic paper grades with the permanent

paper grade costing the least. Agencies should, on a continuing basis, check and compare prices. If, at a given time, there is a significant cost difference between permanent, alkaline, and generic paper grades, NARA will work with agencies to identify specific series of permanently valuable records that can be created on permanent paper without excessive cost.

b. Unless authorized by the Joint Committee on Printing (JCP), Federal departments, establishments and services in the District of Columbia must procure blank paper, including writing, copying, and printing papers through GPO in accordance with 44 U.S.C. 1121. Locations outside of the Washington metropolitan area should procure paper through normal supply channels such as the Government Printing Office (GPO) and the Federal Supply Service of the General Services Administration (GSA) in accordance with the Federal Information Resources Management Regulation (FIRMR) bulletin B-4.

c. Attached is a complete list of all JCP specified alkaline and permanent paper grades, including GSA National Stock Numbers (NSN) when available. The JCP standard specifications are available in the "Government Paper Specification Standards, No. 10" on a subscription basis through the Superintendent of Documents. For purchases and further information, customers may contact GPO's Chief, Paper and Materials Control Section at 202-512-0208, FAX 202-512-1569 and GSA's Procurement and Contracting Office at 212-264-3252, FAX 212-264-4920.

7. NARA assistance. Records officers are encouraged to contact their designated NARA appraisal archivists for assistance in selecting the appropriate paper for agency records series. Questions may also be directed to the NARA Office of Records Administration, Agency Services Division at 301-713-6677, FAX 301-713-6850, TDD 301-713-6760.

JOHN W. CARLIN
Archivist of the United States

Attachment

LIST OF PAPERS FOR FEDERAL RECORDS

Following is the complete list of all permanent and alkaline paper grades specified by the Joint Committee on Printing (JCP) which are available from the Government Printing Office (GPO). Compatible General Services Administration (GSA) National Stock Numbers (NSN) are also listed.

The list begins with permanent and alkaline papers especially well-suited for routine use in laser printers and high speed xerographic copiers since most Federal records result from these processes. Annotations helpful to the average user are offered.

For prices and further information, customers may contact: GPO's Chief, Paper and Materials Control Section at 202-512-0208, FAX 202-512-1569 and GSA's Procurement and Contracting Office at 212-264-3252, FAX 212-264-4920.

LASER AND XEROGRAPHIC PAPERS

Permanent:

1.* GSA NSN 7530-01-398-2656 25% Bond, White, 20 lb., 8-1/2"x11" (meets JCP G40)

2. GSA NSN 7530-01-398-2654 Plain Copier, Xerographic, White,

20 lb.,8-1/2"x11" (meets JCP O60)

3. GSA NSN 7530-01-398-2655 Plain Copier, Xerographic, White, 20 lb., 8-1/2"x14" (meets JCP O60)

4. JCP G40-Option A, 25% Bond, White and Colored. For stationery, forms, legal documents, ledgers, etc. which are used in high speed photocopiers, laser printers, plain paper telefacsimile machines, and impact-type computer printers and with pen or pencil. Above average performance for two-sided copying and erasing quality. Watermarked with U.S. seal, year, and recycled symbol.

5. JCP G60-Option A, Opacified Bond, White and Buff. Greater opacity than G40. Uses and watermark same as G40.

6. JCP O60-Option A, Plain Copier, Xerographic, White, Natural, and Colored. For high speed photocopiers, laser printers, and plain paper telefacsimile machines.

* Meets recovered and postconsumer materials percentages cited in Executive Order 12873, Federal Recycling, Acquisition, and Use of Environmentally Preferable Products and Services

Alkaline:

7.* GSA NSN 7530-01-398-2652 Recycled Plain Copier, Xerographic,
White, 20 lb., 8-1/2"x11" (meets JCP O65)

8.* GSA NSN 7530-01-398-2653 Recycled Plain Copier, Xerographic, White, 20 lb., 8-1/2"x14" (meets JCP O65)

9. JCP O65, Recycled Plain Copier, Xerographic (when ordering from GPO, request special alkaline modification). For high speed photocopiers, laser printers, and plain paper telefacsimile machines.

* Meets recovered and postconsumer materials percentages cited in Executive Order 12873, Federal Recycling, Acquisition, and Use of Environmentally Preferable Products and Services

ADDITIONAL PAPERS COMMONLY USED IN OFFICES

Permanent Papers:

10. JCP A270 Uncoated Permanent Book, White and Cream White. For two-sided offset printing of books, pamphlets, maps, etc.

11. JCP H30-Option A, Imitation Parchment, Laser-Finish, White and Colored. For high-quality offset printing of certificates, etc. Suitable for line illustrations and embossing. The 24 pound weight can be used in photocopiers and laser printers.

Alkaline Papers:

12. JCP A60-Option A, Offset Book (w/postconsumer material content). For two-sided printing of books, catalogs, folders, etc. The 80 pound weight is suitable for posters. Contains a minimum of 20% postconsumer material.

13. JCP A61-Option A, No. 1 Offset Book, Smooth-Finish. For highest quality two-sided offset printing.

14. JCP A75-Option A, Light Weight Offset Book (Bible Paper).

15. JCP A80-Option A, Opacified Offset Book.

16. JCP A90-Option A, Vellum-Finish Book.

17. JCP A180-Option A, Litho (Gloss) Coated Book. For high quality offset printing of books, periodicals, maps, etc.

18. JCP A240-Option A, Matte Coated Offset Book.

19. JCP A260-Option A, Dull Coated Offset Book. For high quality reproduction of satellite and high-altitude imagery as well as offset printing of books, maps, etc.

20. JCP F10-Option A, Manifold, White and Colored. For one-sided offset printing of multicopy forms and correspondence that are used in typewriters and with pen or pencil.

21. JCP J10-Option A, Ledger, White and Colored. For two-sided offset printing of forms, ledgers, notices, posters, etc.

22. JCP K10-Option A, Index, White and Colored. For two-sided printing of cards, forms, notices, posters, covers, etc. that are used in typewriters and with pen or pencil.

23. JCP L10-Option A, Litho (Gloss) Coated Cover, White and India Tint. Uses same as A180, but as a cover paper.

24. JCP L20-Option A, Vellum-Finish Cover, White and Colored.

25. JCP L23-Option A, Offset Cover.

26. JCP L50-Option A, Matte Coated Cover.

27. JCP L60-Option A, Dull Coated Cover.